

WHAT IS CLAIMED IS:

1. A process for producing a paper product comprising:
providing a base web containing pulp fibers;
guiding said base web through an embossing nip, said embossing nip being formed between a pattern roll and a backing roll, said pattern roll comprising raised bonding elements, said nip being heated; and
subjecting said base web to sufficient temperature and pressure within said nip such that inter-fiber bonding occurs where said base web contacts said raised bonding elements resulting in a well defined embossed pattern.
2. A process as defined in claim 1, wherein said embossing nip is heated to a temperature between about 100°F and about 500°F.
3. A process as defined in claim 1, wherein said embossing nip is heated to a temperature between about 180°F and about 490°F.
4. A process as defined in claim 1, wherein said embossing nip is heated by heating said pattern roll.
5. A process as defined in claim 4, wherein said base web is guided around a portion of said heated pattern roll prior to entering said embossing nip.
6. A process as defined in claim 1, wherein said embossing nip is heated by heating said pattern roll and said backing roll.
7. A process as defined in claim 1, wherein said pressure within said embossing nip is less than about 500 pli.
8. A process as defined in claim 1, wherein said pressure within said embossing nip is between about 100 pli and about 400 pli.
9. A process as defined in claim 1, wherein the total area of contact between said raised bonding elements and said base web comprises between about 2% and about 60% of the total surface area of said base web.
10. A process as defined in claim 1, wherein the residence time of said base web within said nip is from about 2.5 milliseconds to about 25 milliseconds.
11. A process as defined in claim 1, wherein said paper product is a multi-ply paper product.

12. A process for producing a ply bonded paper product comprising:
providing a base sheet comprising at least two plies, said base sheet comprising pulp fibers, each said ply having a basis weight of from about 6 lb/ream to about 50 lb/ream;

guiding said base sheet through an embossing nip, said embossing nip being formed between a pattern roll and a backing roll, said pattern roll comprising raised bonding elements, said embossing nip being heated to a temperature of between about 100°F and about 500°F, wherein the residence time of said base sheet within said embossing nip is between about 2.5 milliseconds and about 25 milliseconds; and

subjecting said base sheet to sufficient temperature and pressure within said embossing nip such that said pulp fibers bond where said base sheet contacts said raised bonding elements resulting in a well defined embossed pattern having a glassine appearance and bonding between said at least two plies, said contact area comprising between about 2% and about 60% of the total surface area of said base sheet.

13. A process as defined in claim 12, wherein said embossing nip is heated to a temperature between about 180°F and about 490°F.

14. A process as defined in claim 12, wherein said embossing nip is heated by heating said pattern roll.

15. A process as defined in claim 14, wherein said pattern roll is heated by circulation of a heated fluid within said pattern roll.

16. A process as defined in claim 12, wherein said embossing nip is heated by heating said pattern roll and said backing roll.

17. A process as defined in claim 12, wherein said pressure within said embossing nip is less than about 500 pli.

18. A process as defined in claim 12, wherein said pressure within said embossing nip is between about 100 pli and about 400 pli.

19. A process as defined in claim 12, wherein said contact area comprises between about 5% and about 30% of the total surface area of said

base sheet.

20. A process as defined in claim 12, wherein said raised bonding elements comprise a decorative pattern.

21. An embossed paper product comprising:
a base web, said base web having a basis weight of from about 6 lb/ream to about 70 lb/ream, said base web comprising pulp fibers; and
a decorative pattern embossed by means of heat and pressure into said base web, said pattern being defined by fiber bonding areas, said fiber bonding areas comprising regions where said pulp fibers have been bonded together.

22. An embossed paper product as defined in claim 21, wherein said decorative pattern exhibits a glassine appearance.

23. An embossed paper product as defined in claim 21, wherein said embossed paper product is a tissue product.

24. An embossed paper product as defined in claim 23, wherein said pulp fibers comprise at least 80% by weight of said base web.

25. An embossed paper product as defined in claim 23, wherein said base web consists essentially of pulp fibers.

26. An embossed paper product as defined in claim 21, wherein said paper product comprises more than one ply and wherein said plies are bonded together within the fiber bonding areas.

27. An embossed paper product as defined in claim 21, wherein said base web has an absorbency of from about 5 grams H₂O/gram fiber to about 9 gram H₂O/gram fiber.

28. An embossed paper product as defined in claim 21, wherein said decorative pattern comprises a repeating pattern of discreet shapes.

29. An embossed paper product as defined in claim 21, wherein said decorative pattern comprises a reticulated pattern.

30. An embossed paper product as defined in claim 21, wherein said decorative pattern comprises from about 2% to about 60% of the total surface

area of said base web.

31. An embossed paper product as defined in claim 21, wherein said decorative pattern comprises from about 5% to about 30% of the total surface area of said base web.

32. A multi-ply paper product comprising:

a first ply comprising pulp fibers;

a second ply also comprising pulp fibers, the first ply being positioned in an overlapping relationship with the second ply;

rows of perforation spaced apart along the length of the multi-ply paper product, each of the rows being substantially perpendicular to the length of the paper product; and

bond areas attaching the first ply to the second ply, the bond areas being located adjacent to the perforations, the bond areas comprising areas where pulp material from the first ply has been glassined together with pulp material from the second ply.

33. A multi-ply paper product as defined in Claim 32, wherein said product comprises a bath tissue.

34. A multi-ply paper product as defined in Claim 32, wherein said product has a basis weight less than about 30 pounds per ream.

35. A multi-ply paper product as defined in Claim 32, wherein said product has a basis weight greater than about 30 pounds per ream.

36. A multi-ply paper product as defined in Claim 32, wherein said product comprises a paper towel.

37. A method of contemporaneously perforating and attaching a plurality of pulp fiber plies together, the method comprising:

arranging the plurality of pulp fiber plies in an overlapping configuration;

perforating the plurality of pulp fiber plies; and

pressing and therein fusing the plurality of pulp fiber plies together adjacent to the formed perforations under a pressure sufficient to cause said plies to glassine and fuse together.

38. A method according to claim 37, wherein the pressing step also includes heating the plurality of pulp fiber plies in order to facilitate fusing.

39. A method according to Claim 37, including the additional step of bunching the plurality of pulp fiber plies together adjacent to the formed perforations.

40. An apparatus for simultaneously perforating, glassining, and attaching two or more paper plies comprising:

a plurality of perforator blades, the perforator blades defining a generally rectangular plate with a plurality of teeth arranged along a principal plane, the teeth having chamfered flat surfaces, the chamfered flat surfaces being configured so as to define an oblique with respect to the principal plane;

a rotatable perforator head, the perforator head defining a circumference, the perforator head configured so as to securely hold the perforator blades about the circumference; and

an anvil, the anvil defining a flat surface disposed adjacent to and at an angle to the perforator head and configured to intersect the path of the perforator blades as the blades are rotated by the perforator head.

41. An apparatus according to Claim 40, wherein the anvil is configured to be heated.

42. An apparatus according to Claim 40, wherein the perforator blades are configured to be heated.

43. An apparatus according to Claim 40, wherein the perforator blades and the anvil are positioned with respect to one another such that the perforator blades contact the flat surface defined by the anvil and bend an amount sufficient such that the chamfered flat surfaces of the teeth located on the perforator blades lay substantially flat against the surface of the anvil.

44. An apparatus according to Claim 40, wherein the pressure between the chamfered flat surfaces of the teeth located on the perforator blades and the flat surface of the anvil are sufficient to cause pulp fibers to glassine and fuse together as the perforator blade is slid across the surface of the anvil.

45. An apparatus according to Claim 40, wherein the chamfered flat surfaces of the teeth form an angle of greater than about 0° to about 45° with the principal plane.

46. An apparatus according to Claim 40, wherein the flat surface of the anvil forms an angle of less than about 30° with a horizontal datum line tangent to the circumference of the perforator head.